State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #_____
HRI #_____
Trinomial_____
NRHP Status Code_____
Other Listings_____
Review Code_____ Reviewer_____ Date_____

 Resource name(s) or number(assigned by recorder) N-221

P1. Other Identifier: 40'x80' Wind Tunnel

***P2. Location:** ☒Not for Publication ☐Unrestricted ***a. County** Santa Clara
***b. USGS 7.5' Quad** San Francisco North, Calif. **Date:** 1995
***c. Address** 750 De France Avenue **City** Moffett Field **Zip** 94035
***e. Other Locational Data:**

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Constructed in 1944, Building N-221 was originally built as the 40 x80 Ft Wind Tunnel. This large eight-acre complex of buildings has had several additions over its lifetime. The current complex is composed of four sections: the 40 x 80 Ft Test Chamber (N-221), 2 x 2 Ft Transonic Wind Tunnel (N-222), the 80 x 120 Ft Wind Tunnel (N-221B), and the 20-G Centrifuge facility (N-221A). These buildings feature concrete foundations, corrugated metal and transite cement asbestos corrugated siding, geodesic steel bent structural frames and a multi-gable roof. For the purposes of this DPR 523A form, only the 40 x 80 Ft Test Chamber will be described. This building has a rectangular-shaped plan with an interior courtyard. It is surrounded by a structural exoskeleton comprised of geodesic steel bents, which encloses the corrugated metal and cement asbestoes siding. The building has a variety of interior uses including office, laboratory, and research space. It is 150,900 sq. ft.

This building appears to be in good condition.

***P3b. Resource Attributes:** (list attributes and codes) HP39 – Other: Laboratory & Research; HP39 – Wind Tunnel

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other

P5a. Photo

P5b. Photo: (view and date)
View of east façade, (8/12/05)

***P6. Date Constructed/Age and Sources:** 1944

***P7. Owner and Address:**
United States of America as represented by National Aeronautics and Space Administration (NASA)

***P8. Recorded by:**
Page & Turnbull, Inc.
724 Pine Street
San Francisco, CA 94108

***P9. Date Recorded:** 08/12/05

***P10. Survey Type:**
Reconnaissance

***P11. Report Citation:** Lori Neff, *Department of Parks and Recreation – Historic Resources Inventory "Bldg. N221, 40 X 80 Ft. Wind Tunnel,"* (1995); National Register nomination, "Ames Aeronautical Laboratory 40 x 80 Foot Wind Tunnel," pending nomination, n.d.

***Attachments:** ☐None ☐Location Map ☐Sketch Map ☐Continuation Sheet ☒Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (list)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #_____
HRI#_____

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 2S2

***Resource Name or #** N-221

B1. Historic name: 40x80 ft Wind Tunnel
B2. Common name: 40x80 ft Wind Tunnel
B3. Original Use: Wind Tunnel B4. Present use: Wind Tunnel and Offices
***B5. Architectural Style:** Art Moderne and Utilitarian
***B6. Construction History:** (Construction date, alterations, and date of alterations)
1944 – Date of Construction; 1944 to 1948 – Interior modifications; 1961 – Height Control Test Apparatus built; 1972 – Modernization project; 1979 to 1980 – Interior modification to wind tunnel; Mid-1990s – Original 40x80 test section removed and replaced.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**_____ **Original Location:**_____
***B8. Related Features:**
Significant architectural features include exoskeleton comprised of geodesic steel bents and plan.

B9a. Architect: National Advisory Committee for Aeromautics (NACA) Engineers b. Builder:
***B10. Significance: Theme** Post-War Science and Space Exploration **Area** NASA Ames Research Center
Period of Significance 1943 – Present **Property Type** Administration Building **Applicable Criteria** 1 & 3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity)

Building N-221 houses "The National Full-Scale Aerodynamics Complex (NFAC)," which is the largest wind tunnel complex in the world; consisting of the 40- by 80-Foot Wind Tunnel, the 80- by 120-Foot Wind Tunnel, and the Outdoor Aerodynamic Research Facility. This building is eligible for inclusion in th National Register of Historic Places under Criterion A (Events) and Criterion C (Design/Construction). Building N-221 is significant in the areas of space exploration and settlement (1944-Present) and science and invention (1943 – Present), as well as an engineering structure, which embodies the distinctive characteristics of wind tunnel construction. Originally, this structure was an experimental facility for researching and testing jet aircrafts and first generation jet engines, advanced rotor techniques, and peripheral space use testing. As defined in *The Winds Tunnels of NASA,* a wind tunnel is a device that is composed of "an enclosed passage through which air is driven by a fan or any appropriate drive system. The heart of the wind tunnel is the test section, in which a scale model is supportred in a carefully controlled airstream, which produces a flow of air about the model, duplicating that of the full-scale aircraft." It currently is utilized in this same capacity and helps in testing the landing and takeoff of high performance aircrafts and spacecrafts, and testing Vertical and Short Take-Off and Landing (V/STOL) aircrafts and rotorcrafts. This building possesses integrity of location, design, setting, materials, workmanship, feeling, and association. The exterior of the 40x80 Wind Tunnel retains more integrity than the interior, which has been significantly altered over time. However, these interior alterations are in keeping with its function as a research and testing facility, which commonly required technology upgrades over time. See Continuation Sheet for Wind Tunnel technical capabilities.

B11. Additional Resource Attributes: (List attributes and codes) (HP6) -- Office Building; (HP39) -- Wind Tunnel

***B12. References (also refer to Continuation Sheets):**

- National Register of Historic Places nomination, *Ames Aeronautical Laboratory 40x80 Foot Wind Tunnel* (n.d.) [information obtained from NASA Ames Research Center staff]
- Donald Baels and William R. Corliss, *The Wind Tunnels of NASA* (NASA SP-440, 1981)
- Lori Neff, *Department of Parks and Recreation – Historic Resources Inventory "Bldg. N221, 40 X 80 Ft. Wind Tunnel,"* (1995).

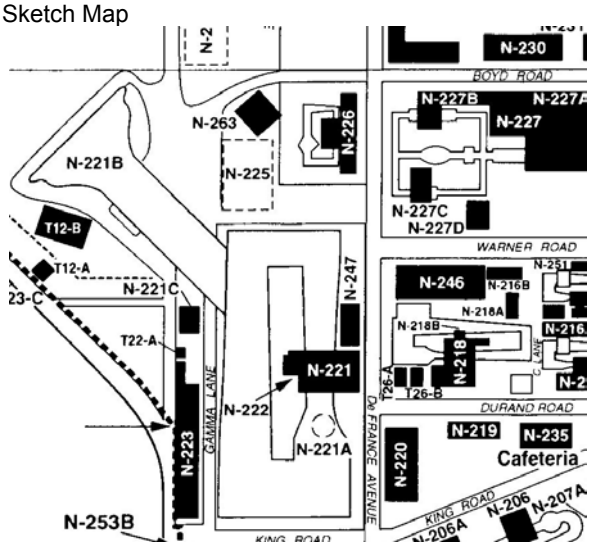
B13. Remarks:
This building is in the process of being nominated to the National Register of Historic Places.

***B14. Evaluator:** Rich Sucre
Page & Turnbull, Inc.
724 Pine Street
San Francisco, CA 94108

***Date of Evaluation:** 10/18/2005

(This space reserved for official comments.)

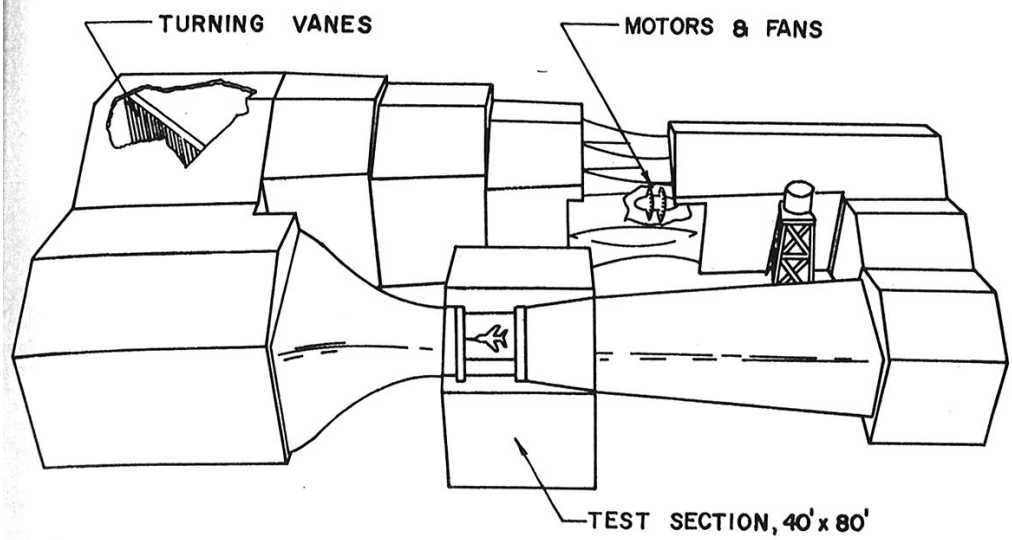
Sketch Map



***B12. References (cont'd):**

- National Aeronautics and Space Administration, *Technical Facilities Catalog*, Volume 1, publication NHB 8800.5A (1), October 1974.
- Technical Information Division, Ames Research Center, *Ames Research Facilities Summary,* 1974.
- Donald D. Baals and William R. Corliss, *Wind Tunnels of NASA,* NASA SP-440, 1981.

N221



DESCRIPTION

The 40-ft x 80-ft wind tunnel is a large, subsonic, closed-throat tunnel with a test section 40 ft high x 80 ft wide. The air circuit is closed. The air is driven by 6 40-ft-diameter fans, each powered by a 6000-hp electric motor. The speed of the fans and of the air flow through the test section is continuously variable from zero to 200 knots. This facility was rehabilitated during 1973 and early 1974. FURTHUR ADDITIONS WERE MADE IN 1985 WHEN A LARGER WIND TUNNEL LEG, KNOWN AS THE 80 FT X 120 FT TEST WAS JOINED INTO THE 40 FT X 80 FT. CHARACTERISTICS

Reynolds Number, per ft:	0 to 2.1 x 10^6
Stagnation Pressure, atm:	1.0
Temperature:	Generally between ambient and 600°R, depending on operating conditions
Test-Section Height, ft:	40.0
Test-Section Width, ft:	80.0
Test-Section Length, ft:	80.0
Test-Section Doors, ft:	49 x 80, on top of test section
Tunnel Airspeed:	0 to ~~200~~ 300+ knots, continuously variable
CURRENT STATUS:	ACTIVE — D.O.D.

1-11